

**What is claimed:**

1. An illumination device comprising:

a substrate having a surface and including a highly thermally conductive heat spreader;

5 a plurality of light emitting diodes (LEDs) supported by the surface, the LEDs arranged in an array to provide illumination;

at least one reflective barrier at least partially surrounding each LED, the reflective barrier shaped to reflect away from the LED light emitted by other LEDs in the array;

the LEDs and the reflective barrier thermally coupled to the heat spreader to  
10 dissipate heat generated by the LEDs and heat produced by light absorption.

2. The device of claim 1 wherein the substrate comprises an LTCC-M heat spreader.

15 3. The device of claim 1 wherein the at least one reflective barrier comprises a periodic array of troughs and reflective ridges, the ridges shaped to reflect away from an LED light from an LED in an adjacent trough.

4. The device of claim 1 wherein the at least one reflective barrier comprises a reflective ridge shaped to reflect away LED light from an adjacent LED.

5. The device of claim 1 wherein at least one reflective barrier comprises a cup  
5 substantially peripherally surrounding an LED to reflect light away from adjacent LEDs.

6. The device of claim 4 wherein the at least one reflective barrier comprises an array of cups, each cup substantially peripherally surrounding a respective LED to reflect light away from adjacent LEDs.

7. The device of claim 1 wherein the at least one reflective barrier comprises a  
10 plurality of reflective circular sectors arranged in a circle, each reflective sector shaped to reflect away light from other sectors in the array.

8. The device of claim 1 wherein the at least one reflective barrier comprises a cavity having reflective walls and one or more smoothly curved reflective edges formed by the cooling of molten metal.

15 9. The device of claim 1 wherein the at least one reflective barrier is shaped to provide directional illumination.